EXPEDITION

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OF THE UNIVERSITY OF PENNSYLVANIA

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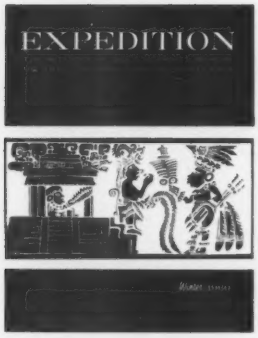

(Cover) Part of a decorative carved band on a cylindrical tripod vessel found in a grave in Tikal, Guatemala, by The University Museum's expedition during the 1959 field season. The band depicts two priests receiving a file of warriors who carry throwing sticks and spears. The vessel is believed to have been made at Teotihuacan in the Valley of Mexico, a thousand miles northwest of Tikal. Drawing by Norman J. Johnston.

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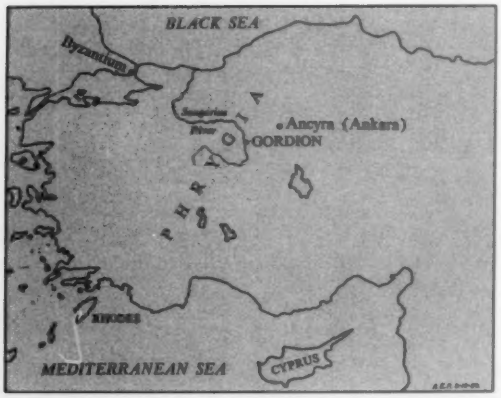
GORDION:
Phrygian Construction and Architecture

By RODNEY S. YOUNG
Photographs by the Author



MAP BY A. ERIC PARKINSON

The traveller in Near Eastern lands cannot help but be struck by the hundreds of ancient mounds—Tels or Tepes or Huyuks, as they are called locally—which dot every landscape, from Teheran to Baghdad to Ankara. When he alights at one which is being dug by archaeologists, as at Gordion, his first question almost invariably is "How on earth did these ancient settlements get buried so deeply?" The answer is, of course, they were mostly self-burying. Except for a thin surface deposit at the top, made by decaying vegetation, browsing animals, and dust left by the wind, the bulk of most of the mounds consists of the fallen and

disintegrated building material of the successive periods of habitation, spread one on top of the other like the layers of a cake. When an ancient town was destroyed by accident or by flood or in war it was usually rebuilt on the same site, but at a higher level. The debris from the destruction of the earlier town was not carted away, as it would be nowadays; instead, it was merely levelled to a more or less even surface and the new construction laid on top. Thus the growth of these mounds was ever upward, and the longer they were inhabited the higher they became until some reached a height of eighty feet or more before they were finally abandoned.

The digger cutting into one of these mounds will find a succession of levels of habitation, consisting each of a floor or ground-level with stumps of the walls of the houses above and their foundations below. The overlying debris will be largely of building material collapsed from these walls, with perhaps a few objects which had been inside the houses to offer a date for the destruction or abandonment. Beneath the floors will lie the debris of an earlier period, perhaps covered by a layer of earth or clay put down to make a level surface for the new settlement and usually producing a few artifacts which may serve to date approximately the rebuilding. Such objects are dear to the heart of the archaeologist, since they are the evidence on which he can base his chronological schemes, and they are brought to the excavation house to be catalogued, described, photographed, and kept for the admiration of posterity.

The bulk of the material callously carted away from the dig to the dump, however, was once the fabric of the buildings which housed these objects and the people who made and used them—stones, tiles, wood, burnt and crude brick. The nature of these materials will vary from site to site in accordance with what the surrounding region afforded. Where stone was lacking or difficult of access construction was usually of brick; where wood was rare and expensive construction was of brick or stone, and roofs were sometimes vaulted. From the disintegrated building materials together with the stumps of the walls on which they once stood the archaeologist must reconstruct his buildings and architecture. By the way he may pick up details about the various tools and processes used by the ancient builders. In general these turn out to be surprisingly similar to the ones still in use today in rural districts, and much can be learned about ancient usage by observing modern. We have few descriptions of ancient tools and methods of building; they were probably considered so obvious and commonplace as to be taken for granted and passed over in silence. In country districts these crafts and their tools have come down, probably from the Bronze Age, as part of the heritage passed on from generation to generation over thousands of years.

The materials used for building by the eighth century Phrygians at Gordion were wood, stone, crude brick, and reeds. Burnt brick and baked terracotta tiles have not been found at these levels and were evidently not yet used. The flood-plain of the Sangarios River afforded an inexhaustible supply of clay for making crude brick, and the hills round about offered various kinds of stone suitable for cutting into building blocks. Great beds of reeds grew in swampy places along the river. Although the modern landscape is as bare as bare can be and the few trees that grow now —poplar, willow, and wild pear—are limited to the margins of the river and the irrigation ditches, the hillsides were certainly once clothed in woods which have since disappeared. The profusion with which wood was used in Phrygian construction and the size of the timbers preclude importation from very far away. It is estimated that more than two hundred separate pieces, each measuring from 20 to 30 feet in length, were used in building the Royal Tomb under the great tumulus, dug in 1957. These timbers were of Syrian juniper and black pine, the kinds of trees which would grow naturally on the surrounding hillsides. At all levels in Gordion, from the Hittite to the Hellenistic, specimens of deer horn have been found which have been identified as coming from *cervus elaphus,* a species of deer which requires wooded country to live in. The furniture in the tombs was made of finer woods. Specimens have been identified as box and yew, maple and poplar and pear. Some of these species still grow in the region, and since the furniture was made locally in the inimitable local style, it seems safe to assume that the wood was also of local origin. Although the wooden furniture may seem irrelevant to architectural construction in wood it may actually be pertinent as showing in miniature the marks of certain tools and the methods of joining separate pieces which were also employed in building.

There seems, then, to have been a plentiful supply of local wood in Phrygian times. The trees were cut with axes and their branches trimmed off with adzes; then they were cut to suitable lengths with saws. Unmistakable marks of all these tools have been recognized on numerous timbers. Boring tools such as awls or augers

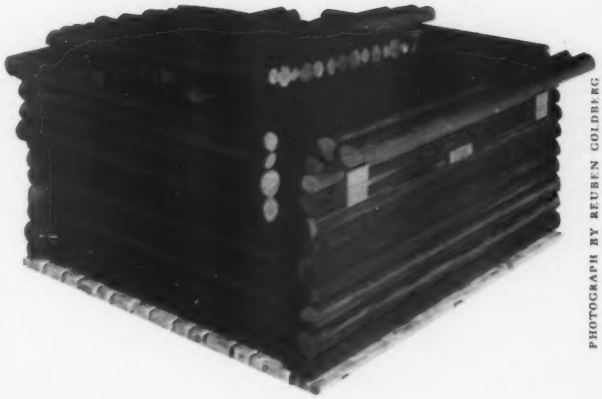
Fig. 1. Plundered cross-wall of Phrygian Gate, bedded on wooden beams. Restored wall at right.

must have been used to make holes when necessary; the marks of these have not been found except on the furniture, where a fine awl was used to make rows of holes in preparation for inlaying. The wood between the holes was then cut out with a sharp knife, leaving a continuous straight bed for the piece to be inlaid, and at the bottom of this bed the ends of the awl borings are clearly visible. Much larger boring tools of the same type must have been used for construction work.

Many logs in the rough state were used as beds for building foundations. In some cases, as under the cross-wall of the city gate, the logs were laid parallel to the direction of the wall under each face, so that the outer edge of the lowest course of masonry rested on them. In due course the wood rotted away, but in cases where it had been bedded in clay the surrounding material has preserved the mould of the timbers, leaving no doubt as to their original existence (Fig. 1). In other cases the logs were laid side by side and close together across the line of the wall bedded on them (Fig. 2). In many instances the ends of the logs projected two or three feet, or more, beyond

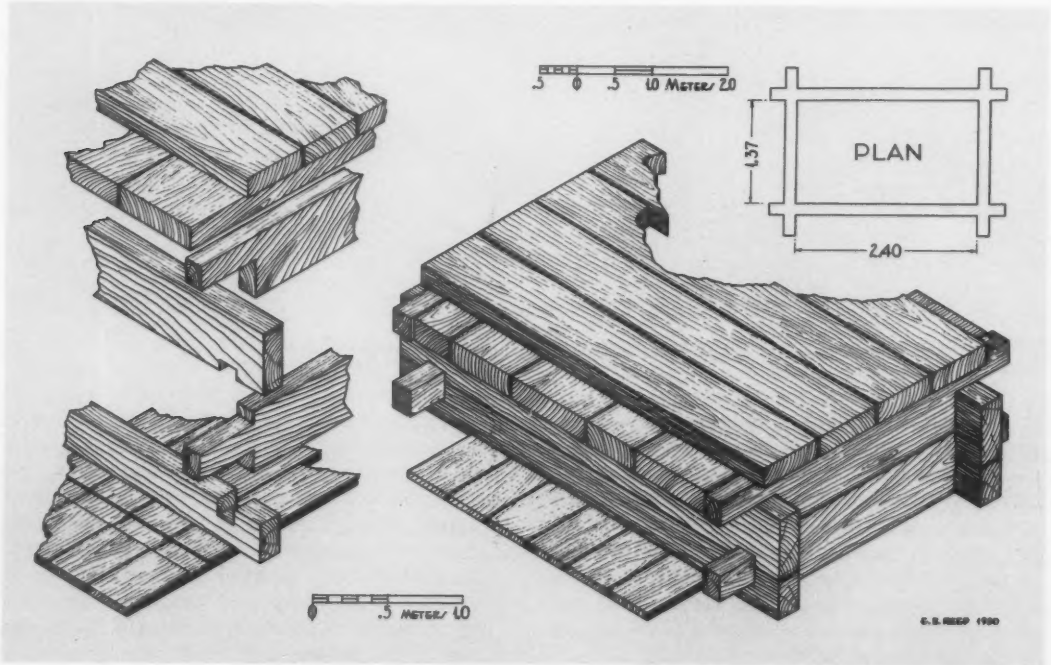
Fig. 2. "Beam Building." Walls bedded on parallel logs.

both faces of the wall they carried and here the purpose seems to have been to spread the weight of the construction over a greater area and so minimize the chance of settling. When walls were built of these roughly trimmed logs, as for the outer casing of the Royal Tomb, the logs were laid alternately in opposite directions to neutralize the natural taper of the tree-trunks (Fig. 3). For a wall with a really fine finish, as that of the tomb itself, the logs were cut to squared timbers either by sawing or with the adze. These timbers were so finely cut and so nicely fitted together that the joints between them are often invisible, their presence betrayed only by the slight differences in color of the adjoining timbers. The fine finish of the wall face must have been given after the erection of the wall. Adze marks, barely visible in a strong light, suggest the penultimate process; the last one must have been some sort of sanding operation. There are no tool marks to be attributed to the plane, which was probably not yet in use. The corners of the tomb chambers were joined by an elaborate system of mortises, best illustrated (Fig. 4) by drawings from a smaller tomb of about the same time as the royal one. These tombs were, of course, structures exclusively of wood, buried underground and covered



PHOTOGRAPH BY REUBEN GOLDBERG
MODEL COURTESY OF GEORGIA-PACIFIC CORPORATION

Fig. 3. Scale model of the Royal Tomb: wood construction.



DRAWING BY E. B. REED

Fig. 4. Restored drawing of a wooden tomb, showing mortises.

Fig. 5. Remains of a "half timbered" Phrygian building of crude brick

by mounds heaped above. The pressure of earth and stones from outside could therefore be counted upon to hold the timbers in place. The corner mortises shown in Fig. 4 were elaborate and would have been self-sustaining; but in other cases simpler mortises were used which counted on outside pressure to hold the timbers in place. The roof beams, too, were in no case fastened down with pegs or nails; they were held in place by the overlying filling.

For proper buildings in the city wood was used in combination with stone or crude brick, in a sort of half-timbered construction. A framework of vertical posts and horizontal beams built into the inner and outer wall faces served to strengthen crude brick construction; at intervals tie-pieces running through the thickness of the wall bound together the inner and outer frames. This is best illustrated in a building of crude brick (Fig. 5) where the wall faces give the appearance of a succession of alternating niches and buttresses. The niches are the slots which were once occupied by the vertical posts, and the buttresses between show the proper wall face, covered with

clay plaster. The wall, three bricks in thickness, breaks off at a uniform height on both faces, whereas the central core of bricks extends higher, pierced at intervals by holes through which the tie-pieces passed. The uniformity of the height at which the outer and inner faces are broken off is due to the fact that horizontal beams were bedded at this level. When the building was burned early in the seventh century, posts and beams burned out and all the construction above the level of the first beam in the wall faces fell. Hence the walls are preserved only to the level of the lowest beam. The central core between the two faces was entirely of brick and so is preserved to a higher level. The vertical posts and the horizontal beams crossed each other at regular intervals and must have been fastened together. A careful examination of every point both inside and outside where beams and posts crossed produced not one single nail or staple of metal. We must therefore conclude that the timber framework was fastened together either by wooden pegs or by mortises. All of the woodwork has of course disappeared and we cannot check. Pegging must remain as a possibility, though the unanimous evidence of the tombs suggests that mortises rather than pegs were used.

Wood was also the obvious material for roofing. The debris over the floors of the Phrygian buildings included charred fragments of the roof beams as well as masses of carbonized reeds and the characteristic fluffy white ash left by freely burned reeds. Many pieces of clay were also found bearing reed impressions on one face, baked hard by the fire that destroyed the buildings. The roofs, then, had been of a type still commonly used in Anatolia: beams at fairly close intervals with supporting cross-pieces of wood laid between them; over this framework a thick layer of reeds and, as outer covering over the reeds, a layer of clay. This type of roofing is entirely satisfactory, requiring only that the outer clay layer be renewed each year; and it may be laid either as a flat or a gabled roof with double slopes. The house built at the edge of the city mound in 1950 for the storing of excavation tools and the like has a gabled roof of just such construction; when it was made it was not realized how closely it resembles ancient Phrygian houses. These last were revealed to us among the pictures —doodles—idly scratched on the wall faces of Phrygian buildings late in the eighth century. One block (Fig. 6) shows three houses with gable roofs, curly finials at their peaks, and central doorway or window. Although one of these may give the impression that they were bird houses,

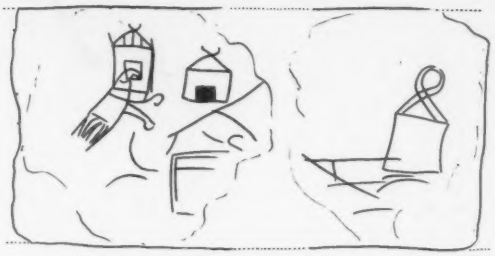


Fig. 6. Eighth century "doodle": three Phrygian houses and a bird

this is not so: the bird that seems to peer forth from the house is an independent drawing, either earlier or later than the house—the stratification is not clear, and so the proper sequence cannot be determined. The doodles suggest that the eighth century Phrygians preferred gabled roofs to flat ones; this is borne out by the roof of the Royal Tomb (Fig. 3) and was a sensible preference in view of the climate of the Anatolian plateau, with plenty of rain and occasionally snow in the winter.

We thus see that wood was generously used in Phrygian construction for the foundations, in walls, in roofs, and unquestionably for doors, door and window frames, and for floors in two-storey buildings. But this relatively large mass of wood would leave little to add to the bulk of destruction debris and to increase the height of the mound. If burned (as it was) it would leave only ash and a little charcoal; if unburned it would quickly rot away leaving nothing. The bulk was supplied by the materials with which the wood had been used, stone and crude brick —especially crude brick. The two materials were often used in combination, stone in the first storey, brick for the second. One is sometimes left gaping at the thought of the quantities of bricks used. In the seventh and early sixth centuries, the time of the Lydian domination of Phrygia, a fortification was built at Gordion to enclose a new suburb. The wall, entirely of crude brick, was about 14 feet thick and around 45 feet high, with large square towers projecting at intervals from its outer face. Against its inner face stood a platform which supported a brick building which was perhaps the barracks for the Lydian garrison. The platform was more than 25 feet wide and much more than 150 feet long—it has not yet been investigated completely—and it now stands to a height of 120 courses of brick; we estimate that about twenty more are missing

Fig. 7. Corner of a platform built solidly of crude brick 120 courses high

from its top. One corner is shown in Fig. 7, not to its full depth because the camera could not take that in. In such places where the top surface of this platform was cut into we found nothing but more brick; the whole thing seems to be one solid mass built entirely of sundried bricks whose numbers must run into the millions.

But again modern practice showed that although the ancient consumption of bricks was conspicuous, their wholesale manufacture must also have been rapid and easy. Before the expedition house was built a mud-brick factory was set up, and it was shown that six men could easily produce more than 1,200 bricks in a day. Our illustration (Fig. 8) shows the mould, open at top and bottom, in which four bricks could be shaped at a time. One workman smoothed the surface of the mixture as it was poured and moved the frame next door, ready for the next load; three ran back and forth with wheelbarrows; and two dancers kept busy treading together the mixture of earth, straw, and water in a pit beside the irrigation ditch, and filling the wheelbarrows with it. The process must have been exactly the same in the eighth century before Christ, probably with hodcarriers substituted for the wheelbarrows. Mass production was rapid and easy; and followed by mass disintegration the crude brick became the major factor in the growth of the ancient mounds.

Stone too was a contributory factor. Unlike crude brick, however, it was usually capable of reuse after the destruction of a settlement. For this reason we find the buildings of the archaic level above the Phrygian city mostly stripped to their foundations because later builders have dug out the worked stones for reuse, as villagers do to this very day unless they are restrained. But the archaic buildings were themselves founded on deep beds of broken stone and rubble stripped in turn from the devastated Phrygian city. The eighth century builders used only soft stone, a sedimentary white or red limestone ("poros"), and sandstone; and their city had been burned. The burned soft blocks were cracked and flaked by fire and had become untrustworthy for reuse as building stones, but broken to rubble they served admirably as foundation beds, often as much as 12 feet deep and 7 to 10 feet in thickness. Huge quantities of ready-made rubble must also have been available, since the Phrygian custom had been to build walls with faces of good masonry and a central core of broken stone. The eighth century methods of building were well demonstrated by a group of modern workmen

who undertook to rebuild part of a wall of the Phrygian gate building. This wall had been taken down by the builders of the archaic city and its stone reused to make a retaining wall under their own gate building. When we realized that the stones belonged to the Phrygian gate and that the foundation on which they had originally stood was intact, it seemed better to rebuild the wall on its own foundations than to cart the stones callously away to the dump. These blocks were recognized by their material, their general shape and finish, and especially by the tooling on their exposed faces, which was identical to that of stones still in place in the Phrygian gate. We had thought these tool marks made by a fairly wide chisel with a slightly rounded end.

The country-style mason who undertook to do the job would brook no interference with his operation. He chose a crew of eight workmen, and the work was done in a week. The tools used were a crowbar to shift blocks, a sledgehammer to make rubble for filling, a mason's mallet to trim blocks and to drive slivers into openings in the joints between courses, and a pick to trim exposed faces so that the tooling exactly matched that of the blocks still in place—so much for our theory of wide convex chisels! Strings were used to get the coursing straight and a plain stick (our meter sticks were refused with scorn) to measure the height of blocks in setting them to their proper course. For lifting the heavy stones the simple device illustrated in Fig. 9 was used—a device which was entirely satisfactory because it could not only lift but also swing blocks horizontally to their place on top of the wall. None of the tools or methods employed were especially complicated, and all were certainly widely known long before the eighth century; what we saw, in fact, was a demonstration of the techniques used by the original builders of the Phrygian gate nearly three thousand years ago. The results were successful; except for a slight difference in the color of the stone and the presence of many more chips chinking the joints (the chinking slivers had fallen out in large numbers from the original construction) the difference between the old masonry and the new is hardly apparent to the casual observer (Fig. 1). To the eye accustomed to proper Phrygian work, however, the difference is more apparent: the ancient walls were made with a slight batter or inward slope of the face, and our modern masons were not quite up to reproducing this. Technically the masons of the twentieth century after Christ are not quite as sophisticated as were those of the eighth century before!

Fig. 8. Modern mudbrick factory

Fig. 9. Modern machine for lifting heavy stones

PHOTOGRAPH BY WILLIAM H. WITTE

LOUIS SHOTRIDGE

By J. ALDEN MASON
Photographs by Reuben Goldberg

Formerly the Museum made a practice of having an American Indian as Assistant in the American Section. Dressed in his native costume, he appealed greatly to the school classes—especially to the younger grades, who listened to his talks on Indian life and customs more avidly than they would to any white teacher. At various times and for short periods the Museum had several of these, but the best known and the one of longest service was Louis Shotridge. Shotridge was on the staff of the Museum, as Assistant or Assistant Curator, for twenty years, from 1912 until 1932. Then, in the great financial depression that forced us to cut everything to the bone, he was one of the casualties.

Louis was a full-blood Chilkat Indian of the larger group known as Tlingit who inhabit the Pacific Coast of southern Alaska, the northernmost of the Northwest Coast tribes whose pictorial art and whose strange social and ceremonial organization based on prestige are famous. He was born in the native village of Klukwan. Here Dr. George B. Gordon, later Director of the Museum, met him on his visits to Alaska in 1905 and 1907 and was evidently greatly impressed by his personality, education, and culture. How he got them I don't know, but he was evidently an outstanding man among his people. He was then (1907) a young man of twenty-four. Probably in the five years before he came to the Museum in 1912 he lived in the United States and became entirely accustomed to urban life. He told me once that he had been an opera singer, but of this phase of his life I know nothing.

Louis was a big man physically, like most of the Northwest Coast Indians, upstanding, dignified, stolid, quiet, likeable. He came of a family of high rank in his community, his father being head chief of the Raven division of the Chilkat and master of the Whale House, and his mother being of the chief family of the Eagle division, a member of the Kaguantan clan and of the Finned House.

To understand the relationship, one must be familiar with the customs of exogamy and matrilineal descent, queer to us. The Chilkat were divided into two phratries, the Raven and the Eagle. One had to marry outside of his or her phratry and belonged to his mother's group. So the children of an Eagle man were Ravens and were considered to belong to the same group as their mother's brothers and sisters but not to their father's; he, on the other hand, had more control over his sister's children. Sometimes the father found his group in hostilities with that of his children.

So Louis was an Eagle of the Kaguantan clan. His first wife, Florence, was naturally a Raven, like his father. She died in Alaska in 1917 but, before this, had lived three years with Louis in Philadelphia where she was a great favorite with all, especially the children, being very intelligent, educated, and sweet. An article of hers, "The Life of a Chilkat Indian Girl," was published in *The Museum Journal* in 1913.

As customary among Indians, Louis was given a single name at birth, Situwuka, or, more phonetically, Stuwuqa. This, the name of several famous chiefs, very appropriately means "astute man." "Shotridge" is a corruption or anglicization of the native name Tlothitckh. This was his grandfather's name and descended to Louis after the former's death; the meaning of the name is not recorded. It is said that the name "Louis" was given him by the first missionary to his people, who arrived there the day that Louis was born.

Apparently Shotridge's first job in the Museum was to make a small-scale model of his native Chilkat village, Klukwan. This model, finished in 1913, was on exhibition for many years, but

PHOTOGRAPH BY WILLIAM H. WITTE

Louis Shotridge in Tlingit ceremonial costume

Model of a Haida Indian village constructed by Louis Shotridge

now, as it occupied much floor space, has been retired to storage. Although he had had no previous training in this art, he made an exquisite true-to-life model, with everything—houses, trees, boats, inhabitants—in perfect replica and to exact scale. Later he made another equally perfect but smaller model of a Haida Indian village with its totem poles; this is still on exhibition.

Soon Dr. Gordon realized the peculiar qualifications and advantages that Louis had for a museum. As a Tlingit Indian of high rank and family he had the entree to the best circles, and was able to purchase some of the old clan ceremonial paraphernalia and regalia that were handed down from chief to chief and were zealously guarded in boxes, taken out only for ceremonies, and never seen by other collectors. In 1915 he was sent to Alaska for four years to secure such objects and the traditions and myths regarding them. He was much pained to see how much of the old Indian life had vanished since he had left there, the natives neglecting the old ways and ceremonies, and doing day labor in mines, canneries, and logging camps. He returned there again in 1922 for two more years, and apparently most of his time until his retirement was thus spent in Alaska with occasional short periods in Philadelphia.

On these expeditions he had a motorboat called the "Penn" on which he journeyed to the less accessible native villages, for all transportation in that region is by water; there were—and probably are—few and short roads. In addition to visiting his own people, the Tlingit, he made expeditions to the other Indian groups of very different languages, the Haida and the Tsimshian. Most of these expeditions were supported by the local merchant and member of the University Museum Board of Managers, John Wanamaker. From them came the beautiful and extraordinary collection of ceremonial crests, each with its long history, which is one of this Museum's most outstanding possessions, probably unmatched in quality elsewhere.

The ceremonial objects most prized by the Tlingit—as well as by museums and artists—are the clan hats and war helmets. Each belongs to a certain house group, a division of a clan, and its nature is emblematic of that group. The house groups have a definite order of rank and the crests are considered community property, though peculiarly the right of the leader of the house, from whom, at his death, they descend to his sister's son. The major houses also had some crests of lesser rank that they had secured by various means. All of these were kept in chests, and shown or worn only at ceremonies. Shotridge distinguishes two classes of ceremonial headgear, clan hats and war helmets. The helmets, he says, "were ordinarily designed to represent the crests of the ancestors from whom the paternal grandfathers of the warriors who use them had descended."

Most of the fine ceremonial Tlingit objects secured by Shotridge—most of the outstanding ones at least—have been described and figured by him in several articles in *The Museum Journal,* such as "The Emblems of the Tlingit Culture" (Vol. XIX, No. 4). However, some excellent ones have never been published. For instance in his article "War Helmets and Clan Hats of the Tlingit Indians" (Vol. X, Nos. 1-2), he describes six hats or helmets and three ceremonial headdresses of which six are illustrated in color. The other three hats are illustrated herein; he secured them from the leader of the Drum House at Klukwan in 1917.

"Under-Sea Grizzly Bear Helmet"

"Killer-Whale Hat"

The "Under-Sea Grizzly Bear Helmet" is the one worn by Shotridge in the accompanying picture of him in ceremonial costume. Of it he says that it was made for Daqutonk of the Kaguantan clan of Chilkat, the first successful leader of his house group, who also founded the Grizzly Bear House at Klukwan. It was originally claimed by the Tsimshian Tayquadi clan which was fast disappearing, and "had Daqutonk neglected to uphold this crest, it might have been completely lost, which would have been a disgrace for the other grandsons of Tayquadi." It is of carved wood, painted green, red, and black. The eyes and a triangular nose-piece are of inset abalone shell, a pendent tongue of thin copper is attached, and strands of human hair are affixed above the ears. On top is a seven-element column of twined basketwork painted green.

The "Killer-Whale Hat" was made for Gahi who succeeded Daqutonk, his maternal uncle. It also was originally claimed by a Tsimshian clan, but after they were defeated in war it was taken as spoil by their conquerors, the Naniyaaki clan, who employed it as an emblem of courage. This wooden hat is carved in the likeness of the animal and painted green, red, and black, with eyes and nostrils of inset abalone shell. A carved wooden upright crest, painted in the same colors, is fastened at the top, with human hair attached at the back; hair is also affixed at the back of the hat.

"Murrelet Hat"

"Wolf Helmet"

Painted basketry hat

Knife with wolf head

The "Murrelet Hat" belongs to the same group. The murrelet is the traditional crest of the Naysadi clan, to which Yikashaw, brother of Gahi, belonged. Yikashaw had it made for his personal use after he succeeded to the chieftainship on Gahi's death. He built an annex to the Grizzly Bear House and called it the "Drum House." Like the others, this hat is of wood, with low relief carved pictorial elements in stylized art, painted green, red, black, and white. Attached to the top is a carved bird, painted in the same colors, with inset abalone shell, and with human hair affixed to the sides and back.

Some of the other fine ceremonial objects secured by Shotridge from his Tlingit tribesmen are, unfortunately, not accompanied by historical or mythological data—at least on the catalogue cards. The "Wolf Helmet" is a striking war helmet, large, and carved in the shape of a wolf's head. It is more naturalistic than most crests, without the usual stylized low relief art, and is painted in bright colors, red, green, black, and white, with large eyes of abalone shell. The wooden ears are separately attached, and the sharp inset canine teeth are apparently carved of bone.

One of the largest ceremonial hats, nameless, twenty-four inches in diameter, is not of wood but of stiff but flexible twined basketry, painted with stylized pictorial designs in red, black, and green; these are now considerably faded. Attached to the top is a wooden crest representing a killer-whale fin, painted red, green, and black, with eyes and teeth of abalone shell, and with a fringe of horsehair at the back.

The large knife that Shotridge is holding in his photograph was secured, probably with Louis' help, by Dr. Gordon in 1905 at the time they first became acquainted. It is a beautiful example of Tlingit art and craftsmanship. The long, thin, sharp blade is of copper, apparently hammered. The canine handle, probably representing a wolf, is naturalistically carved of horn, with lips, nose, eyebrows, and tongue of copper, fastened in by tiny rivets. The characteristic round eyes are of inset abalone shell. It is about twenty inches in length.

One of the loveliest of the many remarkable ceremonial objects secured by Shotridge is a dance baton over nine feet in length. This was carried by a precentor in leading the singing in

Ceremonial baton: "The Wolf Post"

ceremonial dances. Though the anthropomorphic body more resembles that of a bear cub, it is called the "Wolf Post" and is said to have been carved to represent the wolf emblem of the Shungukaedi group. The bright painted colors, as usual red, green, and black, betray little usage. Eyes, teeth, and nostrils are of inset abalone shell, and a copper tongue protrudes. Above the head is a wooden representation of the twined basketry column often found on helmets. The long "fin" is painted with stylized pictorial designs, pairs of small univalve marine shells are inset in the broader edge, and a fringe of human hair is attached to the thinner edge.

Although he published nothing himself beyond his articles in *The Museum Journal,* Shotridge helped a number of well-known anthropologists in their Tlingit researches, including, I think, both Dr. Franz Boas and Dr. Edward Sapir. He supplied the Tlingit information on which Dr. Theresa M. Durlach based her "The Relationship Systems of the Tlingit, Haida, and Tsimshian." In the Museum's collection of phonograph records there are a half dozen old wax cylinders of Tlingit ceremonial or mythological songs sung by him, presumably on the request of Dr. Sapir. He has also left us a large card file of data on the Tlingit under many headings, only a little of which has been published.

Poor Shotridge had a tragic end. He was in Alaska when his connection with the Museum was terminated and he apparently never returned to this country. He had become so accustomed to "civilized" life that he didn't fit in there; he couldn't do logging or can salmon, the main occupations of the deculturized Indian. Moreover, there was some bitter feeling towards him on the part of the Indians for having purchased and sent away some of the old ceremonial objects.

Such is, unfortunately, the lot of many Indians who return to the "reservation" after having been educated outside. Their training very often is useless there and life uncongenial. Their relatives reject them as neither white nor Indian, neither flesh nor fowl.

According to native report, Louis was building himself a small house alone in an unfrequented place. Some fatal accident occurred and he was not found until very much later. A number of years after his death, a letter from a Seattle bank came to my attention, addressed to him, and referring to the inactivity of his savings account for many years. I gave them all the information I could and I understand that his boy received a sizable sum thereby.

WANTED: MORE AND BETTER ARCHAEOLOGISTS

By A. V. KIDDER

This article, from the Proceedings of the American Philosophical Society, *Vol. 83, and here reprinted under a new title and with a few very minor changes, represents the distillation of long thinking about the history of mankind seen from the perspective of the archaeologist. It is a broader perspective than that of most historians, both in space and time, strongly influenced by the necessity of dealing with the material remains of people long dead before their doings were recorded by the written word. Not all archaeologists, in fact only a very few, ever reach the stage of thoughtful, long viewing that Dr. Kidder's article presents. Archaeology is a study based on innumerable details—millions of bits and scraps of evidence. Most of its professionals never reach beyond the detail, but when they do, as Dr. Kidder has done, it is worth reading and thinking about. We are most grateful to the American Philosophical Society for permission to republish his article.*

THE archaeologist is the only grave robber whose activities are contemplated by society without abhorrence, the reason, of course, being that the men and women whose tombs he violates have ceased to be persons and have faded, nameless and unremembered, into the mists of the past.

To this loss of individuality, this merging of the great with the humble, the good with the bad, this universal levelling and averaging, is due the major distinction between the study of archaeology and that of recorded history. Although it has its drawbacks in obscuring the enormous influence that single men of outstanding ability must always have exercised in directing the march of events and in the development of human culture, it permits a breadth of outlook, a smoothing, so to speak, of the curves of history, that should give unique opportunity to perceive the major trends of man's career.

I say "should" advisedly, for just as the historian or the student of art or literature risks over preoccupation with the lives and achievements of persons, so can the archaeologist all too easily immerse himself in the details of his profession: with the puzzles of stratigraphy, the decipherment of glyphs, the fascinating problems encountered in every excavation.

So it is good for an archaeologist to be forced to take stock, to survey his field, to attempt to show what bearing his delvings into the past may have upon our judgment of present day life; and what service, if any, he renders to the community beyond filling the cases of museums and supplying material for the magazine sections of the Sunday papers. And this might seem a particularly difficult task for one who, like myself, is concerned with the prehistory of the American Indians, a vanishing race which played no part in laying the foundations of present-day world culture.

But, as I hope to show, knowledge of the history of these first occupants of the New World can aid in throwing light upon fundamental and vitally important problems.

Perhaps the most striking phenomenon of man's career has been the strange series of ups and downs which have marked his slow climb toward the heights. From the dawn of the Stone Age to the present day, we have been striving for a more comfortable existence, for better relationships with our fellows, and for artistic and spiritual improvement. And progress has been ever upward. But that progress has been the gain of the race as a whole rather than of any single group. For while many peoples have played outstanding roles in the long drama, no one of them has held more than brief pre-eminence. A succession of brilliant nations have contributed their bit to the total, but every one of them has ultimately fallen.

If one plots graphically the course of human development and maps the migration of leadership from one part of the world to another, it is seen that while there has been a comforting general rise in the line of civilization, its mounting course has been interrupted by drops proportionate in violence to the height of each preceding peak; and the map shows that once a people has reached a position at the top of the heap it invariably has fallen, and leadership has been taken over by dwellers in some other land. All of which would seem to mean that our present order is due for a terrific smash and that the next advance will be made by races other than those of Western Europe and the United States.

Of course it is pleasant to feel that there will be another rise and that civilization itself is not necessarily doomed; and perhaps the people who are going to be the next overlords will run the world more intelligently than we do. Nevertheless, it is disquieting to consider even the temporary break-up of our culture or the passing of our race. What can we do about it? How can we smooth the curve, how eliminate the perhaps not inevitable drop, how keep ourselves in the cultural running?

What has happened in the past? It is of course the business of the archaeologists and the historians to find out. But they have not done so. At least not convincingly. And we do not yet know why former civilizations have withered, nor do we know why their seeds, finding lodgement in new racial soil, have almost always produced stronger cultural offspring. A thousand explanations have been offered. The geneticist attributes slumps to bad genes and recoveries to happy combinations of good ones; the nutritionist sees things in terms of vitamins; the medical man in terms of diseases; the sociologist perceives faults or virtues in this or that aspect of social organization. The theologian blames heresies. And if all else fail, we can always appeal to climatic change or economic determinism.

But, as we hope to show, the world's worst troubles have in the past been, are now, and will continue to be, due to a single underlying cause; and that is to man's inability to cope at certain critical periods with the cultural machine he has built. That is the fundamental difficulty, the hidden disease of which depressions, class clashes, wars, are the outward and visible symptoms. To explain:

Few people realize just what has happened to us humans during the million or so years of our career as *Homo sapiens*. Throughout those uncounted millennia we have been surrendering our inherited abilities, one by one, to that something, outside of ourselves, which we call culture, and which, in its more highly developed form, is known as civilization.

Every animal, save only man, comes into the world endowed with all, or very nearly all, the knowledge required to carry on its individual existence. An oriole does not need to be taught to weave its nest; a deer does not learn from its parents how to circle and watch its back-track to see if an enemy is in pursuit. Such knowledges and skills are inherited. We, on the other hand, are born intellectually naked. Nothing is transmitted to us from former generations beyond our physical make-up and a receptive but empty mind. We have become this way by sloughing off, through the ages, one innate attribute after another. Natural hardihood we have exchanged for fire and houses and clothing; brute strength for weapons. We have at last, and this is an appalling thought, even abandoned most of our instincts, save the urge to exercise such purely organic functions as feeding and reproducing ourselves. We have entrusted everything to our culture, a pooled sum of common experience, which is now completely non-biological, outside of ourselves, which is not inherited, and which can only be passed from one individual to another by the teaching-learning process. Everything must be learned. Take away our culture; place, for example, a hundred male and female children, utterly untaught, and reared only just to the point of being able to feed themselves, upon an island well supplied with natural foods. They will probably continue to live. They might, though it is doubtful, bring children into the world and raise them. But they would have no

speech, no knowledge of fire, no conception of the use of any tool. Would their descendants, in the unlikely event of their survival, recreate a culture; and if so, would it take the countless millennia that were required for man to work through the first steps of his ascent from a purely animal life? These questions may seem academic, but they bear on the very fundamentals of man's present nature, and of that civilization to which, as has been said, we have entrusted so much. Civilization, being the creation of exceptional brains, and always being carried forward by a relatively small number of unusual individuals, is never really common human property. And constantly being added to, it tends to outgrow the ability of the average man, or indeed the capacity of any single man, to comprehend in its entirety or to make use of it in the most effective manner. Culture, too, is unrestrained by the slow-working laws of biological evolution. Thus it moves onward at such a rate that the human brain cannot develop fast enough to keep pace with it. Furthermore, and this is the really serious aspect of the matter, it expands unevenly and its material side always tends to outstrip its spiritual and ethical attributes. Hence culture can, and history teaches us that it repeatedly has, become so overwhelmingly complex and so materialistically overweighted as to bring confusion and ruin to those very peoples who have been most active in its creation. So, although our culture, our civilization, is our greatest triumph, it is also our most dangerous possession. Of this truth, it is perhaps unnecessary to state, the most striking example is offered by the perilous stresses now being brought about by recent advances in the physical and biological sciences.

On the physical side, we all know what the development of labor saving machinery has caused in the way of social and economic dislocations. The biological sciences together with biochemistry are permitting medicine vastly to reduce infant mortality and thus allowing to grow to maturity, and to reproduce themselves, countless thousands of weaklings who would not otherwise have survived, to the certain deterioration of the race. Upon what modern science has done for warfare it is, at the present moment, quite unnecessary to enlarge.

I said, a moment ago, that while our civilization is our greatest triumph, it is also our most dangerous possession. It is dangerous, to repeat, because it has always tended to become overweighted, specialized, on the material side. Particularly has this been the case during the past two centuries. And overspecialization inevitably carries the seeds of extinction. Consider the animal kingdom—take, for example, the dinosaurs. They specialized to adapt themselves to certain definite environments—their frames were moulded to perform certain special functions. Each species of dinosaur became so perfectly fitted in size, or proportions, or the shape of its teeth to do one thing and one thing only, that when conditions changed, even very slightly, it was physically unable to meet those changes and passed away.

So it has ever been. That is why the largest and the most strangely shaped beasts, the sabre-toothed tigers and the mastodons, have followed the dinosaurs; why the dodo and the great auk and the buffalo perished; why the giraffe, and other over-sized or over-specialized creatures of today are going. While the little, adaptable animals, the squirrels, foxes, rats and mice can face even the competition of man.

And, with us, any sudden change, any catastrophe, falls heaviest upon those who have committed themselves most thoroughly to particular ways of life. The man who could only shoe horses was without a job on the coming of the motor car. Think what happens at the time of a hurricane to those of us who live in the most specialized of modern houses. The electric current fails and we have no heat, no light, no water, no ice. But the farmer continues happily to sit by his stove, and read by his lamp, and pump from his well. New York, supreme example of urban specialization, could not exist a week without coal and gasoline.

Thus it is, in a larger sense, with the civilization of which we are so proud. It has specialized so strongly on the mechanical side that the monkey wrenches of war, or pestilence, or crop failure can bring its delicate mechanism to crashing ruin.

We cannot hope for success in driving this terrific cultural machine we have built, until we know much more about it. Not only must we know what it is today, but what it has been in the past. What is its history? What is the relationship between man and his culture? Given proper opportunity, will all men take certain cultural steps? Are some races more capable than others of building culture? Are others unable to cope with it? And, most important of all, is culture—which has no physical existence, because it is carried solely in the minds of men—is culture subject to laws of development comparable to those which we know control the material world?

These questions bring us at last back to the American Indians, and to the bearing of their history upon the problems under discussion.

Man first came into the New World many thousand years ago. The earliest Indians, and apparently all other groups which later drifted across from Asia, arrived as nomadic hunters. And as savages, or little better, they spread themselves from the Atlantic to the Pacific, from Alaska to Patagonia. For a very long time no significant progress was made, but eventually there came the discovery of agriculture; and with it increase of population and rapid development of higher culture.

This culture, based on maize, got its start well before the time of Christ, somewhere in Middle America or in Western South America, and from there diffused itself over a large part of the New World. A great outward push apparently took place during the first millennium of our era. And toward or about the year 1,000 there was reached a general peak of achievement and a maximum geographical expansion.

Then came a recession. It was not everywhere equally severe, nor were its manifestations simultaneous. But there can be little doubt of its reality. The cities of the Maya Old Empire were abandoned. The temples and pyramids of Teotihuacan in Central Mexico fell into ruin. Something similar was going on in South America, as is evidenced by the break-up of the great early cultures of Peru and Bolivia. It was a sort of American Middle Ages.

New World progress, however, was not permanently halted. For although some groups had definitely shot their bolt, other people, previously unimportant, came to the fore. In South America the Incas, building on the ruins of older and lesser states, welded a vast and powerful empire. The Aztecs were gradually spreading their rule over Mexico. The new orders

seem to have resulted in economic, political, and military, rather than in intellectual achievement—just as Rome surpassed Greece in material and administrative matters, and trailed or imitated her in arts and letters. But the Inca had already brought peace and order to large parts of the Andean region; the Aztecs would doubtless have done the same in Middle America. Under such conditions, even greater heights might well have been attained.

As to this we shall never know. For the white man came with fire and sword; the flimsy, immature political structures of the Incas and Aztecs fell instantly apart. Native American civilization, slowly and painfully built up through the centuries, was brought abruptly and definitely to an end.

This, for the anthropologist, is one of the great tragedies of history. We should so greatly like to know what would have happened if the Indians had been allowed time to work out their problems in their own way. Would the Inca and Aztec empires have continued to expand and flourish? Would they have met and clashed? Would they eventually have been poisoned by the social toxins that, in Europe and Asia, have brought empires, one after another, to ruin? And if the Inca and Aztec had fallen, as Rome fell, would the torch of civilization have passed to others, perhaps in the more temperate zones of North or South America? That was what happened in the case of our own civilization, which was born in the eastern Mediterranean, flowered in Greece, was carried on by Rome, languished through the Middle Ages, and burst forth again in northern Europe.

Would the Indians have invented the wheel? Gunpowder? Would iron have come into use? Would steam have been harnessed? Electricity?

One can believe that these things, or most of them, would have come to pass. There would, of course, have been differences. History, to reverse the proverb, never repeats itself. The contours of the continents, the lay of mountains and plains, forests and deserts, would have played their inevitable roles in shaping the development of the Indian, and the drifts of his culture.

But nevertheless one has the feeling that, by and large, American developments would have continued to parallel those of Eurasia. To make this clear, the analogies between the history of pre-Columbian America and that of the Old World must again be stressed.

In both hemispheres man started from cultural scratch, as a nomadic hunter, a user of stone tools, a palaeolithic savage. In both he spread over great continents and shaped his life to cope with every sort of environment. Then, in both hemispheres, wild plants were brought under cultivation; population increased; concentrations of people brought elaboration of social groupings and rapid progress in the arts. Pottery came into use, fibres and wools were woven into cloth, animals were domesticated, metal working began—first in gold and copper, then in the harder alloy, bronze. Systems of writing were evolved.

Not only in material things do the parallels hold. In the New World as well as in the Old, priesthoods grew and, allying themselves with temporal powers, or becoming rulers in their own right, reared to their gods vast temples adorned with painting and sculpture. The priests and chiefs provided for themselves elaborate tombs richly stocked for the future life. In political history it is the same. In both hemispheres group joined

with group to form tribes; coalitions and conquests brought pre-eminence; empires grew and assumed the paraphernalia of glory.

These are astonishing similarities. And if we believe, as most modern students do, that the Indians' achievement was made independently, and their progress was not stimulated from overseas, then we reach a very significant conclusion. We can infer that human beings possess an innate urge to take certain definite steps toward what we call civilization. And that men also possess the innate ability, given proper environmental conditions, to put that urge into effect. In other words, we must consider that civilization is an inevitable response to laws governing the growth of culture and controlling the man-culture relationship.

If we go that far, if we can admit that there are such fundamental laws, we can assure ourselves that our fate is not entirely controlled by blind, brute accident; that we may, with greater knowledge, some day be able to steer the cultural machine.

So the problem of whether or not Indian development was, so to speak, a home product is much more than a mere archaeological puzzle.

Fuller knowledge of the Indian's history can bring us nearer to understanding the laws of cultural evolution. Such knowledge is also needed for approach to another most difficult, but most important question; this concerns the innate mental equipment of different peoples. Do all races possess the same general sort of brain? Are some racial groups fundamentally more intelligent than others? Have certain races special abilities? Or special defects?

We need to know this because modern transportation has to all intents and purposes, abolished space. And we are busily engaged in spreading a veneer of western European civilization over the entire face of the globe. The process, like the growth of modern mechanical science, cannot be stopped. What will be the result? Are all peoples equally well fitted to assimilate that civilization? Will it destroy the less able? Or, if not destroyed, must they be ruled by overlords of better mentality? What will be the effect upon the human race of the inevitable mixing of blood?

These are problems of a contracting world. They are so pressing, and the need is so great for real understanding of the races and cultures being brought so violently into contact with each other, that the anthropologist looks wistfully at a six-million-dollar telescope to probe an expanding universe. I doubt if half as much has been spent in any one recent year for pure research in any one of the social or humanistic sciences. What one regrets, however, is not the increase in our knowledge of astronomy or of the other exact sciences, but our failure to gain sufficient insight into what makes the human wheels go 'round.

No one can fail to be grateful for what physics and chemistry have done in giving us control of our environment, or for the alleviation of suffering made possible by the advances in medicine and surgery. The anthropologist's plea is not for less research along these lines, but for more research upon the less tangible but, in the long run, even more important aspects of human life. Only with far more accurate knowledge of man's innate abilities, of his relations to his fellow men, and to his culture, can we

hope for safe issue from the troubles brought upon us by our blind and stupid misuse of our newly acquired, and still growing, command of the material world.

The reason, of course, for our slowness in gaining that knowledge is that man is so complex a creature. Lack of progress in the social sciences is due to their inherent difficulty. A plant is harder to understand than any rock, because to its basic chemical structure are added the mysterious forces of life. Any animal presents more baffling problems than any plant—for to life is added the even more mysterious factor of consciousness. And topping the pyramid comes man—a chemical compound like the rocks and the plants and the animals, but to whose life and to whose consciousness are superadded the hitherto ungoverned but all-controlling powers of culture.

It is small wonder that we have made so little headway toward the understanding of man. But the sooner we realize what we are up against the better off we shall be. Only by facing situations can they effectively be grappled with. And the relation of man to his culture, to which we keep harking back, seems to be the one problem with which we must first come to grips.

The human race has surrendered nearly everything to culture. Culture, not man's brain, has come to carry our accumulated store from generation to generation. Culture has grown, evolved. But what of the human brain? We know that in certain ways it has lost, just as our bodies have lost their primitive strength and hardihood. For at birth our brain holds less than that of any other mammal. Far more, however, than any mammal are we capable of learning and of profiting from individual experience. In that way our brains have evolved, enormously. But, and this it seems is the great but, is that evolution still going on? Are we equipped with better mental tools, are we innately more intelligent than we were one, or five, or fifty thousand years ago? Or have we come to be so thoroughly dependent upon culture that we have left it to do our evolving for us? If so, God help us, for our culture, like Frankenstein's monster, is a soulless thing.

The anthropologist, student of man, perceives trends and tendencies which fill him with alarm. But, on the other hand, only the anthropologist can readily appreciate the extraordinary toughness, and persistence, and resourcefulness of the human race. Most of us take our present state for granted—we do not bother to think how hardly it was won. We seldom realize the overwhelming difficulties man has undergone during his long upward struggle; how our naked arboreal ancestors fought their way through the perils of a savage and hostile world; how they added to their power through development of speech, and by the taming of fire; how they put stone and bone and wood to their service as tools. These things the anthropologist realizes probably more clearly than any one else. He sees the human race triumphing, little by little, in the face of countless defeats, over every obstacle; he knows that after each setback the rise has been a little higher. And seeing all these things so clearly he cannot but feel that our present troubles will also be conquered. But, and of this he is sure, salvation can only be attained through greater knowledge of man, not only modern man, but of man throughout the ages, and in both the Old and the New Worlds. In other words, what we really need is more and better archaeologists.

AN ETRUSCAN TOMB-GUARDIAN

By ELLEN KOHLER
Photographs by Reuben Goldberg

The Etruscans are still a mysterious people to us because at the present state of our knowledge we cannot answer the question of their origin. This, our misfortune, is partially due to the fact that twelve cemeteries are all that remain of the great loose confederacy of twelve cities which thrived in Central Italy in the seventh and sixth centuries B.C. The result is that we know more about the Etruscans' beliefs concerning the next world than we do about how they lived and behaved in this world.

Last October a sculptural fragment from an Etruscan cemetery was purchased for the Mediterranean Section of the University Museum. It had reposed for some time prior to that in other collections and its original provenience in Italy is undisclosed. For this reason conclusions about it must be based on the inner evidence of style, technique, and material.

The idea that lions, lionesses, leopards, sometimes winged, sometimes not, were suitable guardians of sepulchres because they had protective powers was an ancient Oriental one which spread to Egypt, Anatolia, even Mycenae, during the Bronze Age and was brought to Etruria from

the East. As inspirers of dread, then, they were, for instance, placed at each side of the entrances of chamber tombs which were cut into hills (as at Veii and Cerveteri), or painted on the walls inside the door. When no hills were available and tumuli were built, they were sometimes put on the peak or ranged round the top of the low girdling walls (as at Chiusi and Vulci). On temple-like sarcophagi deposited inside the tomb chambers (as at Chiusi) they might be found on the lids, either adorning the ridges of each façade or facing outward from each corner.

The Philadelphia lion must have served one of these purposes —but it is to be observed that he is most likely a standing figure. His size would preclude his ever having been merely part of a sarcophagus—as he is slightly over two feet high although broken across the forelegs. He is abraded on his right side and broken behind the shoulders far enough back to reveal the attachment of raised wings, but no evidence is left for the position of the back legs and tail or for the presence of a plinth.

MAP BY A. ERIC PARKINSON

The style of the head is intriguing because the deep vertical cleavage down the forehead, the tendon areas at the back of the foreleg, and the ears half closed down from above although drawn back against the head, all recall the archaic Greek lions in the Corfu Museum dated between 600 and 530 B.C. The thin standing ridge which indicates the mane and the ridgelike ruff behind the jaw resemble those on the seated lion done in relief profile upon the bronze tripod said to be from Perugia, now in the James Loeb Collection in Munich, and dated to the third quarter of the sixth century. The separate jaw- and brow-ruffs, and the ears, are paralleled on a small bronze lion in the round from the collections of the Munich Museum dated to the second half of the sixth.

The Philadelphia lion combines these characteristics, adds the wings of the Etruscan tomb guardian, and might on style alone be dated toward the last quarter of the sixth century B.C.

The technique of the sculptor in this instance is somewhat difficult to analyze, as the surface has been carefully smoothed afterwards with a rubbing tool. But along the wing's curve half-obscured parallel lines show the use of the claw-chisel. Also in the back of the mouth, where later smoothing did not seem necessary, at least five claws can be distinguished. The definite delineation along the ridges and the soft curves elevating the wider planes show a very careful hand with the smoother. The nature of the stone, which contains hard granular bits, was responsible for the partially roughened final surface, because these bits, as in all tufas, which are soft and sandy in composition, have a tendency to rub away or fall out. The piece in general shows excellent workmanship, and nothing observable concerning the technical means used is inconsistent with a date in the late sixth century.

The evidence of the material from which it was made is of some aid in determining its geographical source. Tufa in general was preferred for sculpture in the area from Orvieto on south. North of that sculptured pieces are more likely to be in sandstone and limestone. The pale gray color and fineness of this tufa locate it in central Etruria where such sculptures are well known from Tarquinia, Vulci, and Orvieto. When lists of finds of sculpture in the round from these sites are consulted, it is found that the greatest number of gray tufa lions in captivity comes from Vulci. There are others from Vulci in Berlin, Florence, and The Vatican. The example in the University Museum, then, appears to have numerous and handsome relatives if not a formal pedigree.

TIKAL STELA 29

By EDWIN M. SHOOK
Photographs by William R. Coe

The oldest dated Lowland Maya monument is unearthed in the jungles of Guatemala. For a discussion of Maya dates the reader is referred to the accompanying article by Linton Satterthwaite.

Just short of a century ago, in 1864, canal diggers working in the steaming heat of a coastal swamp a few miles northeast of the present Puerto Barrios, Guatemala's Caribbean seaport, had no premonition that the next shovel load of muck, thrown out on the low embankment, would bring to light one of the most famous Maya art objects known to the world—the Leyden Plaque. This highly polished thin slab of pale green jade shows a delicately incised human figure on the front and, on the back, a long row of Maya hieroglyphs giving a date in Baktun 8 (sometimes called Cycle 8) in the Maya "Long Count." This was the earliest definitely Maya date believed to be contemporaneous with its carving. The Dutch civil engineer, S. A. van Braam, who directed the canal excavations, salvaged the jade plaque and eventually presented it to the Rijksmuseum voor Volkenkunde in Leyden, Holland, where it has been treasured ever since.

Fifty-two years later, on May 5, 1916, Dr. S. G. Morley of the Carnegie Institution of

MAP BY A. ERIC PARKINSON

Washington, while exploring the newly discovered ruins of Uaxactun, fifteen miles north of Tikal, found Stela 9.* This monument, too, became renowned because it was the first Maya stela to be discovered with a Baktun 8 date, and for another forty-three years it was to remain the oldest known contemporaneously dated Lowland Maya large monument.

Little did we of the University's Museum's 1959 Tikal Project staff suspect the importance of a carved stone reported to us one day last spring by Marcos Lopez, one of the Project workmen. Marcos, while passing through a dense section of bush only two hundred yards west of the Great Plaza and just beyond a clearing made for dumping backdirt from the Plaza excavations, noted carving on a stone projecting slightly from the leaf-mold blanketing the forest floor. He had been trained, as have all Project workmen, to report carved stones or any unusual features encountered in Tikal and he called Aubrey Trik's attention to the new sculpture. Trik, the Project architect, inspected the carved stone, brushed away a few more leaves, and correctly identified the sculpture as a new, previously unknown stela. All the staff rushed over to view the partly exposed and weathered sculpture, each speculating on its age, style of carving, whether it was complete, and so forth. The stela lay face up, buried by soil and leaf-mold except for the left edge of the front. We were ignorant for a long time of the dated inscription on the back. We tentatively referred to the stone as the "Marcos Stela."

* Stelae are numbered at each site as they are found. This is Uaxactun Stela 9.

A thick jungle growth enveloped the area of the stela; because of continued unseasonal rains, for fear of damaging the carved surface, we delayed clearing and excavation until the rains let up and the soil dried. Trees in a radius of approximately fifty feet had to be felled to open a breech in the forest canopy large enough for sunlight to penetrate the area and dry the soil burying the monument. The men expertly cut and felled the forest giants away from the carved stela and then cleaned the opened area of rotting leaves and branches which litter the forest floor. This clean-up brought to light several other large stones of which only one showed faint traces of carving. The position of each stone was plotted on a plan of the area and, as the soil dried, a six-inch surface layer was removed and searched for even tiny chips of stone which might belong to the monuments. This operation exposed the outline of Stela 29, lying flat on the ground with its carved front face up, but the monument was not complete. This was a disappointment. We wondered whether we had another example of fragmentation and the resetting of an incomplete stela like many others of Tikal's early monuments.

The upper half lay on the rear slope of a mound near a fragment of a new carved altar (Altar 13). Nearby were two possible fragments of plain monuments. Had the stela fragment been discarded where we found it along with other fragments? Had it lost its importance to the people of Tikal or had the fragment been salvaged from an earlier action of disrespect and re-erected to again serve its original purpose? All these questions and many others confronted us as excavation in the vicinity of Stela 29 continued intermittently.

We dug trenches, east-west and north-south, through the area of the scattered monuments searching for floors, evidence of construction, and the level of undisturbed bedrock, thus leaving Stela 29, as we excavated around it, on a pedestal of earth. Probing under the monument's edges failed to disclose a raised border or any other indication of carving on the under side.

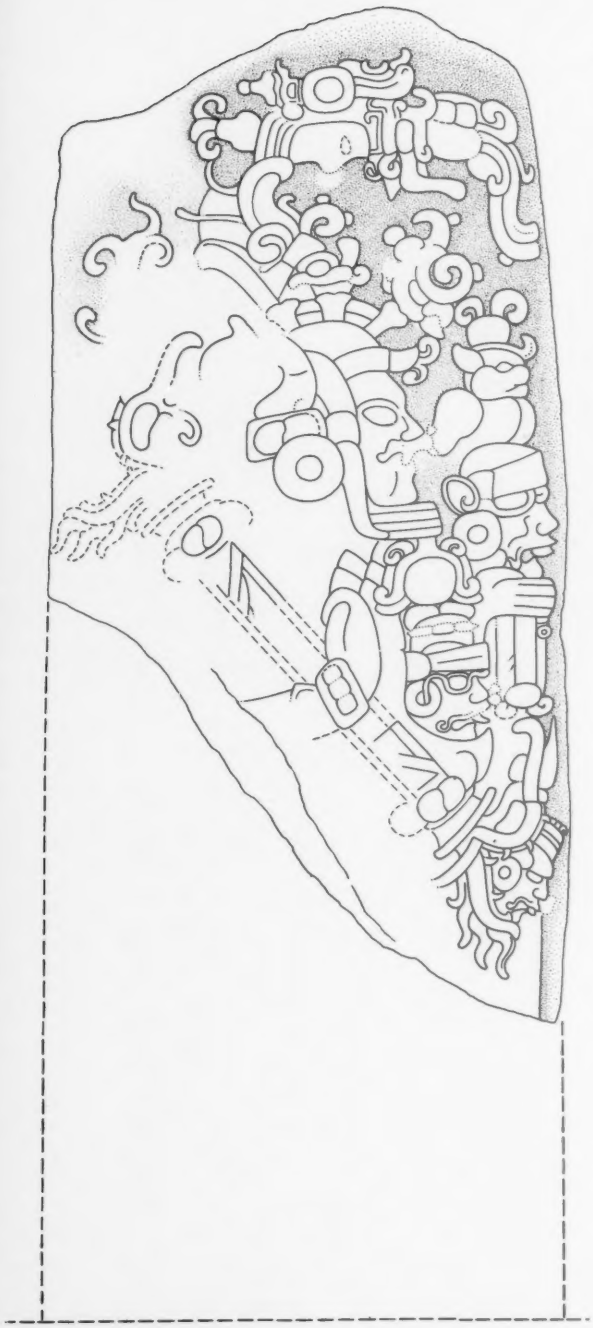
The work in the Great Plaza and elsewhere in Tikal occupied most of our attention, the dry season advanced, and further excavation continued around the Stela 29 area sporadically. We believed the main task had been completed.

Saturday morning, April 4th, Mary B. Ricketson and Benedicta Levine requested some field work as a change from their heavy duties in the

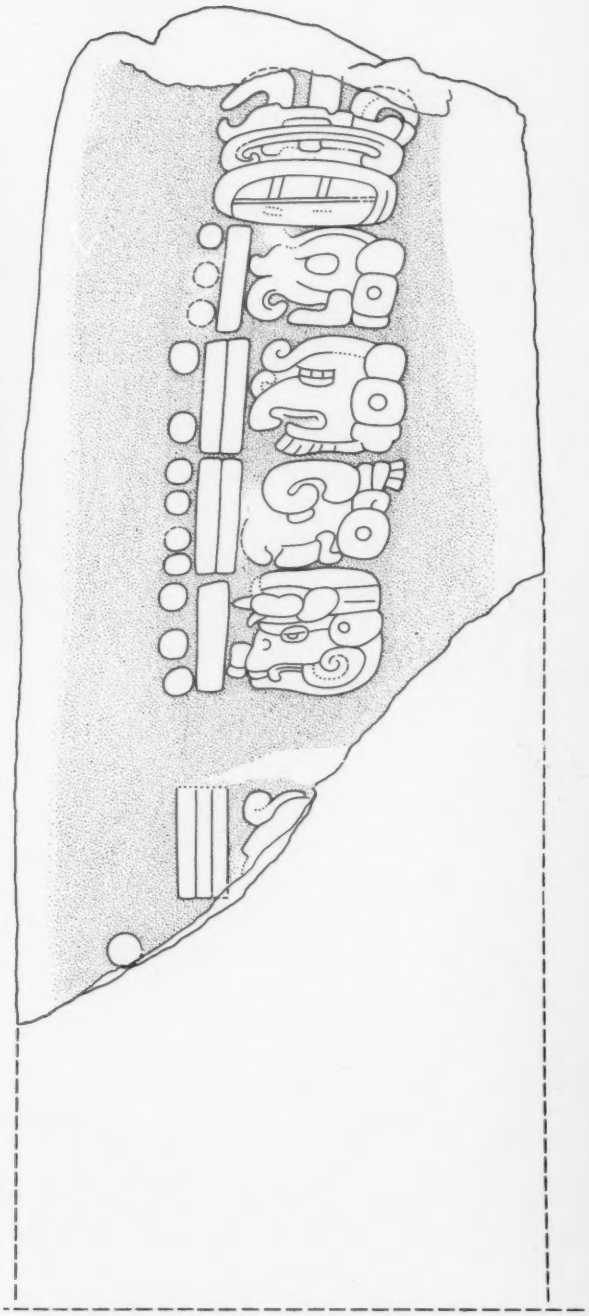
Stela 29 lying as found, in foreground. Men are cleaning the surrounding area.

camp's ceramic laboratory. Stela 29 offered such an opportunity. After six weeks of exposure, the carved front had thoroughly dried but still required further cleaning before it could be photographed. Ricketson and Levine carefully scrubbed the carved area with a soft brush and water and left it to dry. That afternoon I returned with several workmen to raise the stela on one edge for photography. Layers of soil clung to the underside as we turned it but a few chunks dropped off revealing carving. Excitement grew as bars, dots, and part of an Initial Series introducing glyph appeared. We braced the stela on edge and then each man was given a sharpened soft green stick with which gently to pry away the impacted earth. First the introducing glyph was clear, next emerged the bar and two clear dots and the faint trace of a third to indicate a Baktun 8 date. We could not see the katun coefficient but I halted the cleaning long enough to explain to the workmen the importance of the I.S. introducing glyph, the bar and three dots of the baktun, and that no matter what katun should appear we had found the first unquestionable Cycle 8 inscription for Tikal. Their enthusiasm was equal to mine as we, with trembling

Fitting small fragments to the front of the stela. These are attached with an epoxy resin glue.



Stela 29, as is true of all carved Tikal monuments, was exhaustively photographed using controlled light supplied by a portable generator. The negatives, taken at a right angle to the stone, are projected and traced in Philadelphia. A great many prints are used to complete the details of a drawing. These drawings are conceived of as diagrams expressing the certainties



(solid line) and slight uncertainties (dotted line) culled from all photographs. Since Stela 29 is known only by a top fragment, the probable standing height above the surface is indicated by broken line. The maximum length of this limestone fragment is 1.33 meters or 52½ inches; its maximum width, 0.68 meters or 26¾ inches. Drawings by William R. Coe.

The Leyden Plaque, actually an incised pendant of jadeite, which authorities believe to have been made at Tikal. A new drawing by William R. Coe from photographs of the plaque now in Leyden, Holland.

hands, flaked away the soil from the katun glyph. Despite the excitement of the moment, they were unprepared for the war-whoop I let forth when two bars and *two* dots emerged with the katun glyph. Here was a great discovery such as only occasionally rewards days, weeks, months, even years of hard persevering effort. We feverishly cleaned the remaining glyphs, the 14 tuns, 8 uinals, 15 days, and just one dot of the otherwise missing "Calendar Round" date.

Aubrey Trik and all the men working around the Great Plaza heard our shouts of joy and came down to find out what was going on and then they too joined in the excitement. In no time, word travelled through the whole University Museum camp and all hands joined wholeheartedly in a Saturday evening celebration. All, that is, except George Guillemin who buried himself in his room with books from the camp library, paper and pencil, and calculated the missing Calendar Round date as 13 Men 3 Zip, of which only the upper left dot of the number 13 is preserved on the monument.

The following morning, Sunday—our day of rest(?)—Vivian Broman and other staff members assisted with the photography. The film was rushed that afternoon by plane to Guatemala City where Miss Joya Hair and Miss Inga DeWits cheerfully worked that night developing it and making prints. A cable to the University Museum announced the discovery of Stela 29 and prints were immediately forwarded.

Our excitement over the Maya date 8.12.14. 8.15 13 Men 3 Zip may be appreciated in that it precedes that of the Leyden Plaque, known since 1864, and of Uaxactun Stela 9 discovered in 1916.** Until the discovery of Tikal Stela 29, intensive exploration and excavation throughout the Maya area during the past eight decades had not brought to light a large stone monument with a contemporaneous Maya date earlier than that inscribed on the Leyden Plaque. Stela 29 predates the Leyden Plaque by twenty-eight years and Stela 9 at Uaxactun by thirty-six years.

Morley, through a study of the style of carving on the Leyden Plaque, presented a plausible case that this jade pendant actually had been carved in Tikal or the immediate vicinity. We illustrate here an accurate drawing of the Leyden Plaque and also a drawing of Stela 29, both by William R. Coe. A general similarity in style is quite evident. The plaque is in the shape of a miniature stela. The front of each shows a standing, elaborately costumed human figure. Each has a hieroglyphic inscription on the back; on the Leyden Plaque this is a single vertical row of seven large glyphs above a double row of eight smaller glyphs; on Stela 29 is a vertical row of six large glyphs also above a double row of glyphs but, in this case, an unknown number.

We may only speculate as to where the original and complete Stela 29 was erected in Tikal, how long it served in its original position, the cause of its fragmentation, and the whereabouts of its missing lower half. The stela does provide another early contemporaneous Maya inscription dating the sculptural style, both of the human figure on the front and the glyphs on the back. The known practice of carving and erecting large stone monuments in the Lowland Maya area has been extended back in time by thirty-six years. However, we also know that the Highland Maya at Kaminaljuyu and other Mesoamerican people of Guatemala and Mexico, had been erecting carved stone monuments long before the date of Stela 29. Continued excavation and exploration in Tikal quite possibly will uncover still older monuments than Stela 29 but they would have to be considerably older to prove that the Lowland Maya first developed in Mesoamerica the art of hieroglyphic writing and the practice of erecting large stone monuments.

** One would like to be able to give Christian dates which are the equivalents of Maya Long Count dates, but scholars disagree within wide limits. According to the two hypotheses most generally advocated, the three earliest dates now thought to be approximately contemporaneous with their carving correlate with our chronology as follows:

Tikal Stela 29	8.12.14. 8.15	July 6, A.D. 292 or September 8, A.D. 32
Leyden Plaque	8.14. 3. 1. 2	September 15, A.D. 320 or November 17, A.D. 60
Uaxactun Stela 9	8.14.10.13.15	April 9, A.D. 328 or June 11, A.D. 68

The later Christian dates are according to a modification of the "Goodman-Thompson" correlation, the others according to the "Spinden" correlation. The Maya dates are all Cycle 8 (or Baktun 8) dates, while the next earliest legible date at Tikal is on Tikal Stela 9 in the next cycle, Cycle 9. The complete Long Count date on that stela, 9.2.0.0.0, falls in A.D. 475 or A.D. 215, according to the two correlation theories. Irrespective of this troublesome question of correlation with Christian time, Stela 29 extends the period of Maya dated monuments at Tikal back by nearly two centuries (183 of our years).—Editor

MAYA "LONG COUNT" NUMBERS

By LINTON SATTERTHWAITE

The new earliest "Long Count" or "Initial Series" date on Tikal Stela 29 is transcribed as "8.12.14.8.15 13 Men 3 Zip." We here compare it with a random date in our own Christian Civil Calendar system, hoping to bring out similarities as well as differences for the edification of the mildly curious reader. The left part of the tabulation deals with our date A.D. 1960, Thursday, June 23, and the right part with the Maya date of Stela 29. Each element of the Christian date corresponds in some way with that of the Maya date shown on the same line.

The Maya arithmetic system is based on 20, rather than the 10 of our decimal system. When we transcribe their digits into the decimal system we must often use numbers above 10 for a single digit. Hence the points marking off the five digits or terms in "8.12.14.8.15." To make comparison more easy we use them for the Christian date also, "1.9.6.0," so that it is clearer that the Maya Long Count "date" is a numerically expressed one, like our 1960. In the tabulations, both dates are written vertically, as was done on the stela. Then each is repeated, to the right, in the usual Maya bar-dot notation for individual terms or digits, using one bar for each five units in a digit, and one dot for each remaining single unit. In this transcription of the Christian 1.9.6.0 into the Maya bar-dot notation a Maya sign for the zero is necessary, as it might be also in some other Maya number than that on Stela 29. The zero sign would be used wherever needed, just as with us.

COMPARISON OF CHRISTIAN DATE A.D. 1960, THURSDAY, JUNE 23 WITH MAYA "INITIAL SERIES" DATE 8.12.14.8.15 13 MEN 3 ZIP

A.D. Periods				ISIG* Periods			
1.	•	Millennium (10 x 10 x 10 x 1 year)	1 x 1000=1000 years				
9.	⁞I	Centuries (10 x 10 x 1 year)	9 x 100= 900 "	8.	⁞I	Baktuns* (20 x 20 x 1 tun-year)	8 x 400=3200 tun-years
6.	•I	Decades (10 x 1 year)	6 x 10= 60 "	12.	:II	Katuns (20 x 1 tun-year)	12 x 20= 240 "
0.	𝌆	Years (1 year)	0 x 1= 0 "	14.	⁞II	Tuns (1 tun-year=360 days)	14 x 1= 14 "
			1960 years				3454 tun-years
				8.	⁞I	Uinals (20 x 1 day)	8 x 20= 160 days
				15.	III	Kins (1 day)	15 x 1= 15 "
							175 days
Thursday				13 Men (Sacred Round Date)*			
June 23				3 Zip (Vague year Date)			

We may not often think of it, but the expression A.D. 1960 involves the concept of *periods* of time, for which we have names, so we give them in the table (year, decade, century, millennium). The basic period for this "Christian Long Count" is the year. In the Maya Long Count it is a sort of "computing year" called *tun,* always consisting of 360 days (18 x 20), hence shorter than the 365 or 366-day Christian year. Just as the Christian periods increase in value by 10's, starting with the year as the unit, the Maya periods increase by 20's, if we start with the tun as the basic period. As a result, the highest three terms of a Maya 5-place number may cover much more ground than all four terms of the Christian counterpart. Thus the number of Stela 29 covers 3454 "tun-years," and though the tun-year is about 5¼ days shorter than our average year, the period covered is much more than 1960 of our years.

The names for the higher Maya periods based on the tun are *katun* and *baktun,* corresponding to our "decade" and "century," except that they cover more time. The baktun is sometimes called "cycle." So the Stela 29 date is a Baktun 8 or Cycle 8 date. Most Maya dates are later, in Baktun 9.

The Maya were not content to place one at some unknown point within the current computing year or tun. So the lowest two terms give this position in terms of the single day as the basic unit, and 20's of days as the next. These periods were called *kin* (day) and *uinal* (probably meaning "twenty"). This is the reason we have a five-term number instead of a three-term one. In a day-by-day count, on reaching 18 uinals these convert to 1 tun. The full distance covered by 8.12.14.8.15 is 3454 tun-years and 175 days.

Though it was not necessary, on the stone monuments the Maya gave glyphs for the five periods after the necessary bar-dot numerals, and the latter are referred to as the "coefficients" of the respective periods. For an analogy, in the expression "1 millennium," the millennium coefficient is 1. As the illustrations show, on Stela 29 the period glyphs for baktun, katun, and tun are bird heads; that for the uinal is a frog head; the period glyph for kin is missing, but might have been the Sun God's head. Period glyphs, identified by position, may vary much.

At the top of the stela, the text begins with the "Initial Series Introducing Glyph," which corresponds with the "A.D." before 1960 in that it tells us that the count is forward from a standard fixed point in past time, used for nearly all other "Initial Series" dates. This base date, 4 Ahau 8 Cumku, was calculated back into the mythical past, differing in this respect from our base-date or era, which is the historically experienced birth of Christ.

This expression "4 Ahau" places one at the 4th day of a week-like cycle of 13 numbered days, and at the 20th day (called Ahau) of *another* week-like cycle of twenty named days. Either of these "week dates" corresponds fairly well with our 7-day week, and positions in both were regularly recorded. Running concurrently they form a "Sacred Round" period of 260 days, after which positions in both will again be the same. The expression "8 Cumku" means the 8th day of the month called Cumku, in a "vague year" of 365 days. In this second sort of Maya year there were eighteen 20-day named months and an extra 5-day period. Combined with the two "weeks" this set up a 52-year "Calendar Round" permutation, which the Maya shared with other Mesoamericans.

Knowing the Calendar Round date at the Initial Series base, which is implied by the Introducing Glyph, one may calculate what Calendar Round date must be reached by a Long Count number such as the 8.12.14.8.15 of Stela 29. Though it is almost entirely missing, calculation shows that it must have been 13 Men 3 Zip. If the lower portion of the stela is ever found, one can predict that it will show the Sacred Round date 13 Men. In rare cases the Vague Year date was omitted, but if we ever find the year date on the missing half of Stela 29, it will be 3 Zip. In respect to its 365-day period, the vague year corresponds to our year most closely, and like ours it is divided into named months with numbered days of the months. But like the 360-day tun it lacked leap-days and so also falls behind our year, though much more slowly. This is a curious thing, for no one supposes the Maya failed to observe the slip of this vague year in the seasons.

It should be obvious that where one has Maya Long Count control, each date is fixed as so many tuns and days from every other date; if one such Maya date can be clearly correlated with a corresponding Christian date, all are potentially correlated with the proper Christian dates. When our Stela 29 date is said to fall in A.D. 292, that is according to a correlation theory which may be disputed. Choosing some other correlation theory would not affect the evidence that the Stela 29 Initial Series date was carved at Tikal before any of the known others, at Tikal or elsewhere.

Where in the World?

We thought and thought when we first saw the color slide from which this picture was made but couldn't identify it. Can you? The answer is on page 39. The slide was made by Mr. Aubre Givler of Philadelphia to whom we are very grateful for permitting us to use it here.

THE AUTHORS

RODNEY S. YOUNG ("Gordion: Phrygian Construction and Architecture"), Curator of the Mediterranean Section of the University Museum since 1949, initiated the excavation of Gordion in 1950. Since that time he has divided his time between his duties in the Museum, teaching in the University of Pennsylvania, and the direction of the Gordion Expedition. In 1953, he headed a reconnaissance expedition for the Museum to Afghanistan. Between 1933 and 1949, Dr. Young was an Agora Fellow, later a Fulbright Fellow, at the American School of Classical Studies in Athens (except for an interlude for Government service during the war), where his particular interest was in the study and publication of Early Iron Age material. He has published numerous articles in his field in *Hesperia* and the *American Journal of Archaeology*.

J. ALDEN MASON ("Louis Shotridge") was a member of the first undergraduate course in anthropology given at this University in 1904, and worked as photographer and assistant in the Museum in 1909-1910. He received his Ph.D. at the University of California in 1911. After seven years as Assistant Curator at the Field Museum of Natural History in Chicago and one year at the American Museum of Natural History in New York he was for thirty years Curator of the American Section in this Museum, retiring in 1955. He inaugurated the Museum expeditions to Piedras Negras in 1930 and brought out some of the finest examples of monumental Maya sculpture. In 1940 he led the expedition to Coclé, Panama, and brought back pre-Columbian gold ornaments. He has done research in archaeology, linguistics, ethnology, and folklore in Canada and many of the United States as well as in Mexico, Guatemala, Puerto Rico, Panama, and Colombia. His major popular publication is a Pelican book, *Ancient Civilizations of Peru*. In 1958 he was awarded the honorary degree of Litt.D by Franklin and Marshall College.

A. V. KIDDER ("Needed: More and Better Archaeologists") has devoted his life to the archaeology of the Southwestern United States and the Maya of Central America. His pioneer work in the Southwest for Harvard was followed by many years of excavation at Pecos, New Mexico, for Philips Academy, Andover. In 1930 he became Chairman of the Division of Historical Research, Carnegie Institution of Washington. Until his retirement he directed the Carnegie's archaeological program on the Maya in Yucatan, Guatemala, and Honduras. He has received many high academic honors, including the Lucy Wharton Drexel Medal presented by the University Museum in 1958. He is also a Fellow of the Museum.

ELLEN L. KOHLER ("An Etruscan Tomb Guardian") received an M.A. in Latin from the University of Washington in 1942 and a Ph.D. in Classical Archaeology from Bryn Mawr College in 1958. She was a member of the Curium (Cyprus) Expedition of the University Museum in 1949 and has been with the Gordion Expedition in charge of field records since its beginning in 1950. She is now Assistant Curator of the Mediterranean Section and teaches Roman Archaeology in the University of Pennsylvania.

EDWIN M. SHOOK ("Tikal Stela 29") has been Field Director of the Tikal Project of the University Museum and the Government of Guatemala since its beginning in 1956. He has been doing archaeological exploration and excavation in the Maya area of Mexico, Guatemala, and Honduras since 1933, for much of that time as a staff member of the Carnegie Institution of Washington from which he is at present on leave. His most important field work was at Uaxactun, Kaminaljuyu, and Mayapan. His reports on these and other sites have appeared in the Carnegie series of publications.

LINTON SATTERTHWAITE ("Maya 'Long Count' Numbers"), Curator of the American Section, came to the Museum in 1930 as field assistant to Dr. Mason, who was initiating work at Piedras Negras, Guatemala, and continued work there as Field Director, 1933-39. Subsequently he excavated Early Man sites in Wyoming (1940) and California (1944) but his principal interest has been in the ancient Maya civilization. The stelae and altars from Caracol now in the Middle American Hall result from Museum expeditions to British Honduras, of which he had charge (1950-53). These, with Stela 14 from Piedras Negras, brought out by Dr. Mason, constitute by far the largest collection of major Maya sculpture outside the countries of origin. He has visited Tikal each season since the Museum's Tikal Project was initiated, studying the inscriptions of the stone monuments there (1956-59). Publications include reports and articles on field results, and a more theoretical monograph on Maya calendrics and astronomy, *Concepts and Structures of Maya Calendrical Arithmetics*.

SUGGESTED READING

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Where in the World?

See page 38

The great Sphinx near Cairo, seen from the West. That central "mound" is really the back of the head.

TIKAL

A MAP OF THE CENTRAL PORTION OF A FAMOUS MAYA RUIN IN THE LOWLANDS OF GUATEMALA

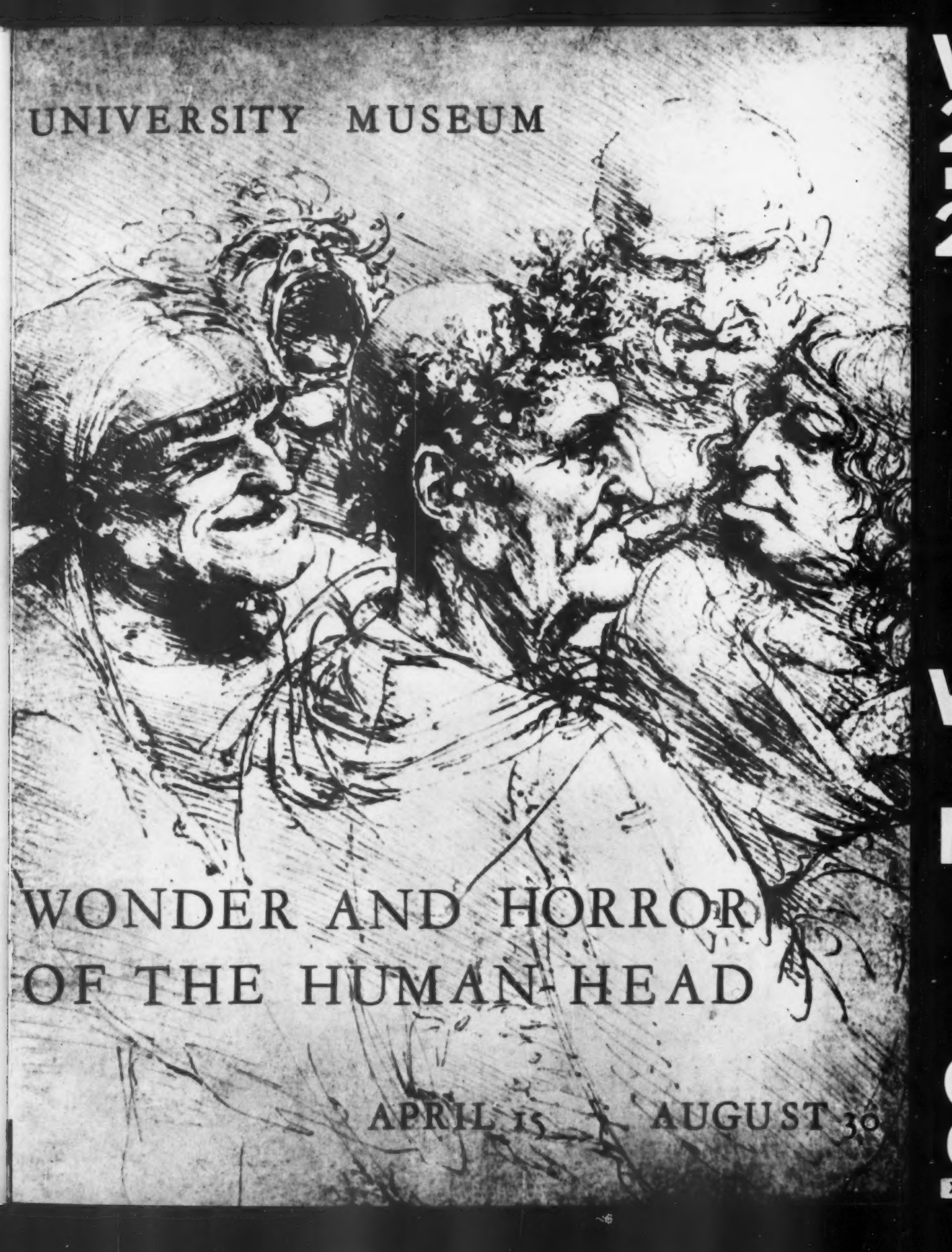
(Supplement to EXPEDITION, *Volume 2, Number 2.)*

Mapping at Tikal has been going on since the 1957-58 season. It is a slow, difficult job, made so by the uneven terrain, the vast number of mounds and still standing structures, and the heavy jungle. This map, designed by Aubrey Trik and drawn by Norman J. Johnston of the School of Fine Arts of the University of Pennsylvania, is based on the detailed topographic survey that is still in progress. It shows only a small part of the whole site, but includes the heart of the ceremonial area, the Great Plaza and the five "great temples" (numbered in Roman numerals) which tower above the highest trees.

Four principal causeways, probably for ceremonial processions, link the Great Plaza area with outlying architectural groups. They are named for the modern discoverer of Tikal, Modesto Mendez, Governor of Peten, who found the site in 1848, and for three great archaeologists who made observations there many years ago—Teobert Maler, Alfred Percival Maudslay, Alfred M. Tozzer.

As impressive and interesting as the ruins, is the tropical forest that surrounds them, especially for those botanically or ornithologically inclined. It is not advisable to leave the roads or trails, unless one knows the site intimately, but it is fascinating to walk the trails in search of birds and monkeys. At Tikal archaeology contributes uniquely to the pleasure of the naturalist for, from the Great Temple and the palaces overlooking the ravine south of the Great Plaza, the treetops are exposed to his view, making possible close-up observation of the innumerable hummingbirds, grotesque toucans, parrots, and dozens of other birds. A visit to Tikal means much more than a quiet look at the ruins to make it complete.

Additional copies of map, not folded, may be obtained from The University Museum; price, fifty cents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WONDER AND HORROR
OF THE HUMAN-HEAD
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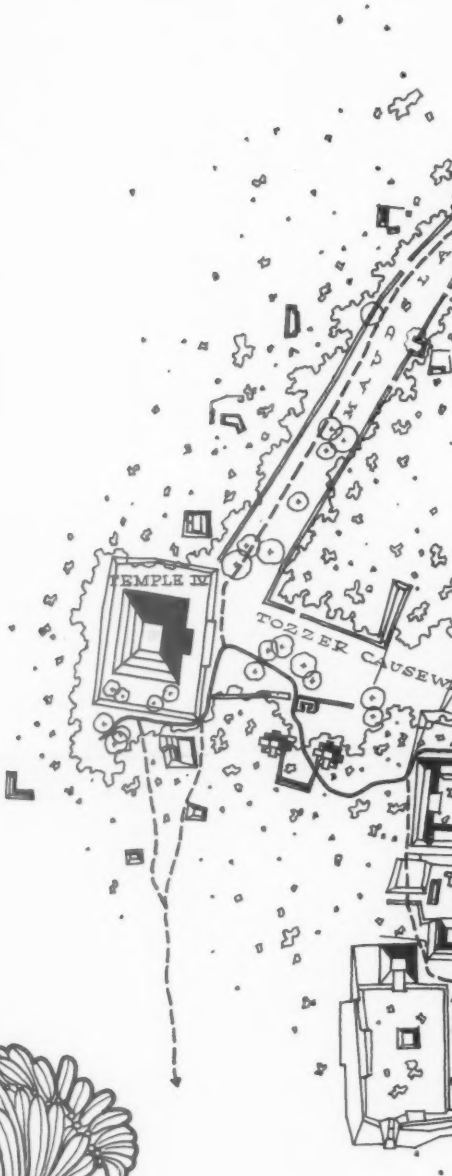

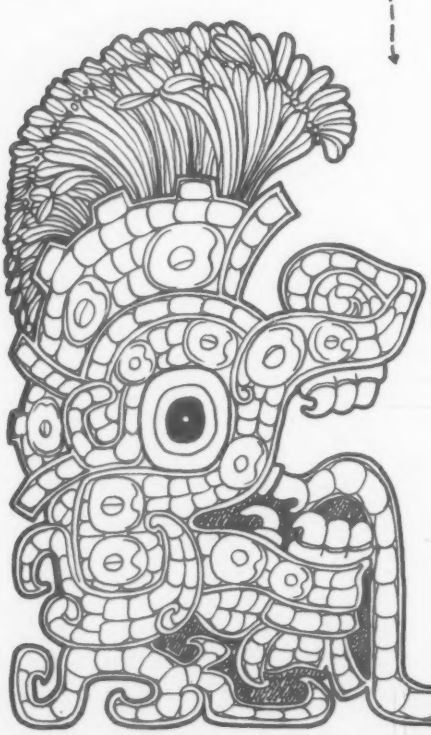

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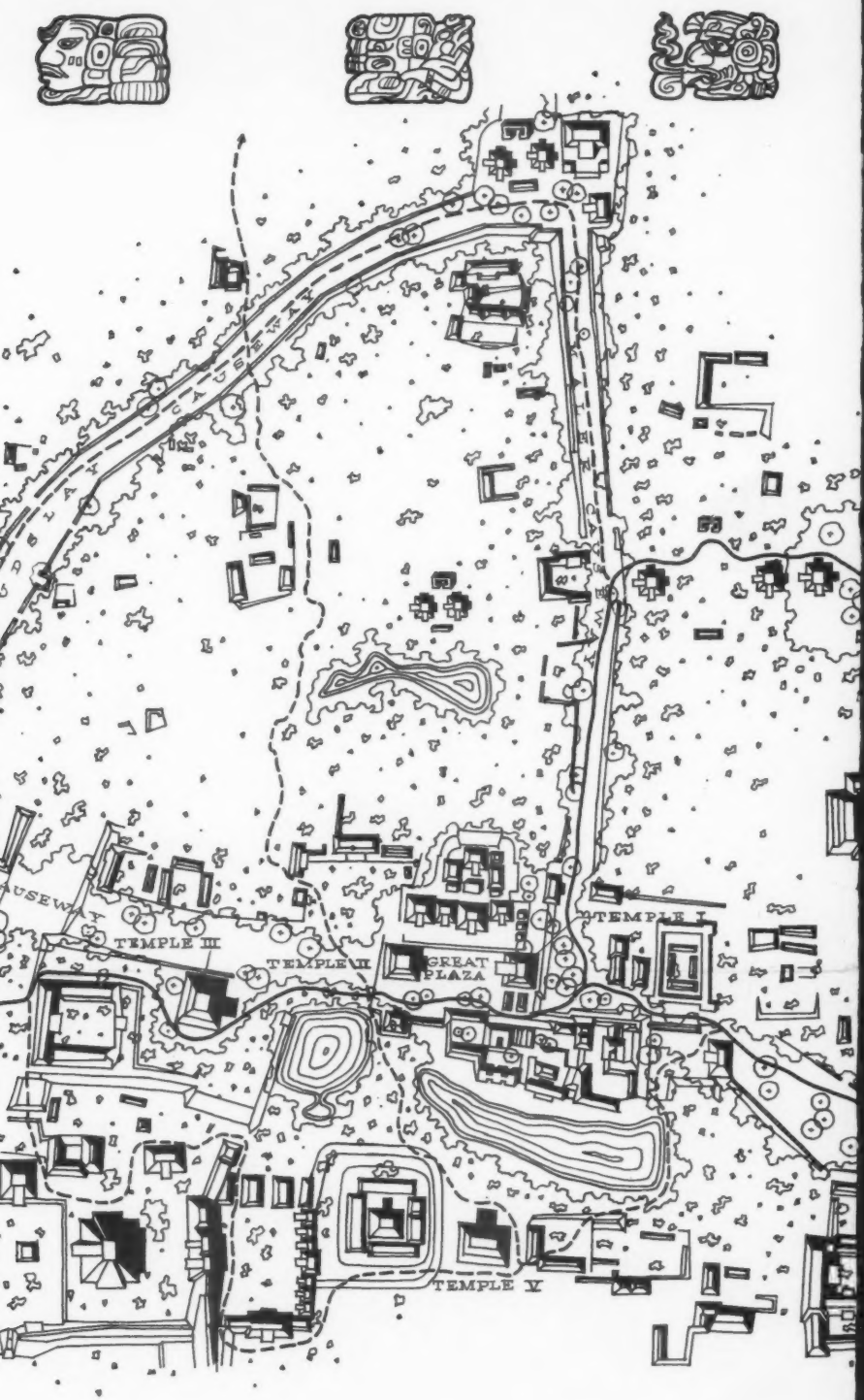

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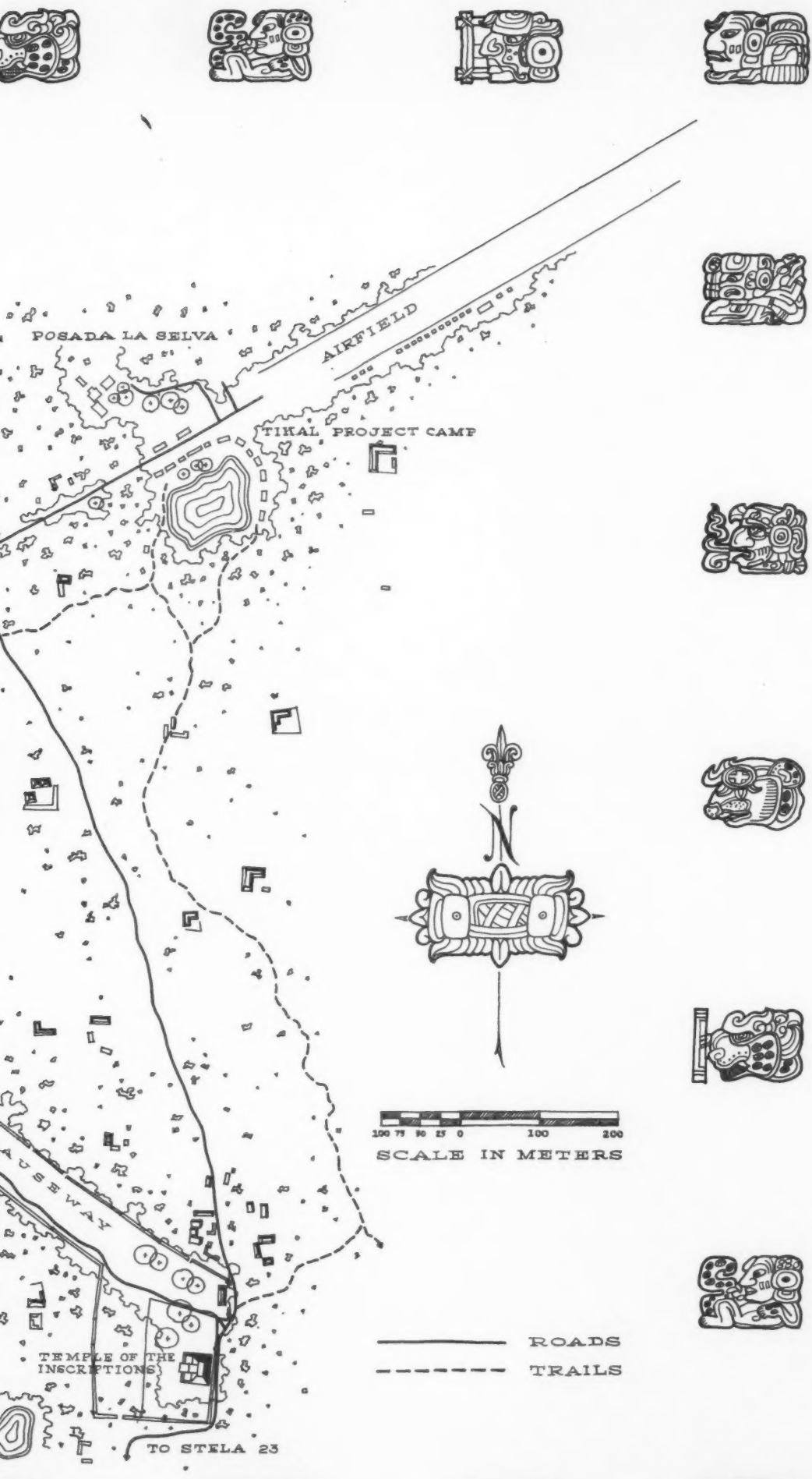

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